

5. RADAR MAP AND TRACK

Lines

FAR-2xx7			FAR-3xxx					
Symbol	Color	Name	IMO or A type			B type		
			Symbol	Color	Name	Symbol	Color	Name
	*	Mark		Yellow-orange	Buoy		*	Mark
	*	Mark		Yellow-orange	Buoy		*	Mark
	*	Nav Line		Magenta	Buoy		*	Nav Line
	*	Coast Line		White	Buoy		*	Coast Line
	*	Contour Line		Gray	Buoy		*	Contour Line
	*	Prohibited Area		Magenta	Prohibited Area		*	Prohibited Area
	*	Danger		Magenta	Danger		*	Danger
	*	Line Buoy		Yellow-orange	Line Mark		*	Line Buoy
	*	Line Buoy		Yellow-orange	Line Mark		*	Line Buoy
	*	Line Mark		Yellow-orange	Line Mark		*	Line Mark
	*	Line Mark		Yellow-orange	Line Mark		*	Line Mark
Other	-	-		Yellow-orange	Line Mark		*	Mark

*: The display color is selectable. See "Contrast table for the display colors" on this page.

Contrast table for the display colors

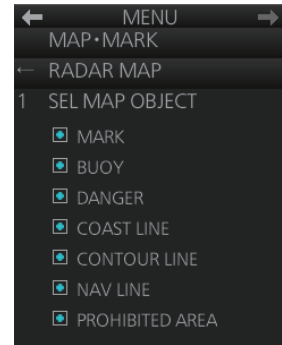
Below is the contrast table for the display colors of the radar map marks and lines.

FAR-2xx7	FAR-3xxx
Red	Red
Yellow	Yellow
Green	Green
Cyan	Cyan
Magenta	Magenta
Blue	Blue
White	White
Other	Green

5.12 How to Show, Hide Radar Map Features

You can show or hide radar map objects as follows:

1. Right-click the [Mark] box then select [Map•Mark Menu] and [2 RADAR MAP].
2. Turn objects on or off as appropriate.
3. Close the menu.



5.13 Track

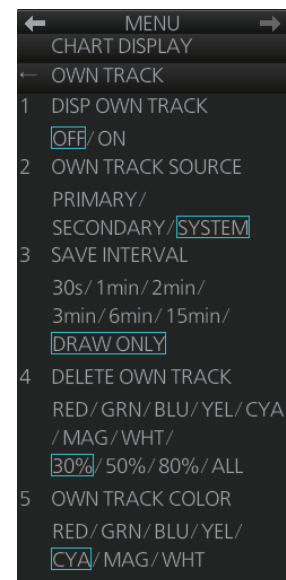
5.13.1 How to set up ship's track

The track traces your ship's movement. This radar records track at the interval you set on the [OWN TRACK] menu, and the recording interval determines the maximum recording time. The longer the interval the longer the recording time, as shown in the table below.

When the memory for track becomes full, the oldest track is deleted to make room for the latest. For that reason you may want to adjust the recording interval so as to keep the track on the display for a longer time.

Save Interval	Max. Recording Time	Save Interval	Max. Recording Time
30 s	6 days 22 hr 40 min	3 min	41 days 16 hr
1 min	13 days 21 hr 20 min	6 min	83 days 8 hr
2 min	27 days 18 hr 40 min	15 min	208 days 5 hr

1. Open the menu then select the [6 CHART DISPLAY] and [1 OWN TRACK] menus.
2. Select [1 DISP OWN TRACK].
3. Select [ON] to show your ship's track or [OFF] to hide the track.
4. Select [2 OWN TRACK SOURCE].
5. Select the navigation sensor that is to feed the position data to use to plot your ship's track, among [PRIMARY], [SECONDARY] and [SYSTEM].
[PRIMARY]: Navigation sensor having first priority.
[SECONDARY]: Navigation sensor having second priority.
[SYSTEM]: Plot own ship's track using system-fed position.
6. Select [3 SAVE INTERVAL].
7. Select how often to save your ship's track, among [30s], [1min], [2min], [3min], [6min] and [15min]. [DRAW ONLY] draws the track but does not save it.
8. **For the B-type radar**, you can select the color for the track with [5 OWN TRACK COLOR].
9. Close the menu.



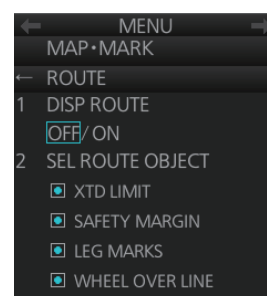
5.13.2 How to erase track

When the display becomes filled with track, for example, your ship traces the same route several times, you may want to delete some or all of your track from the display.

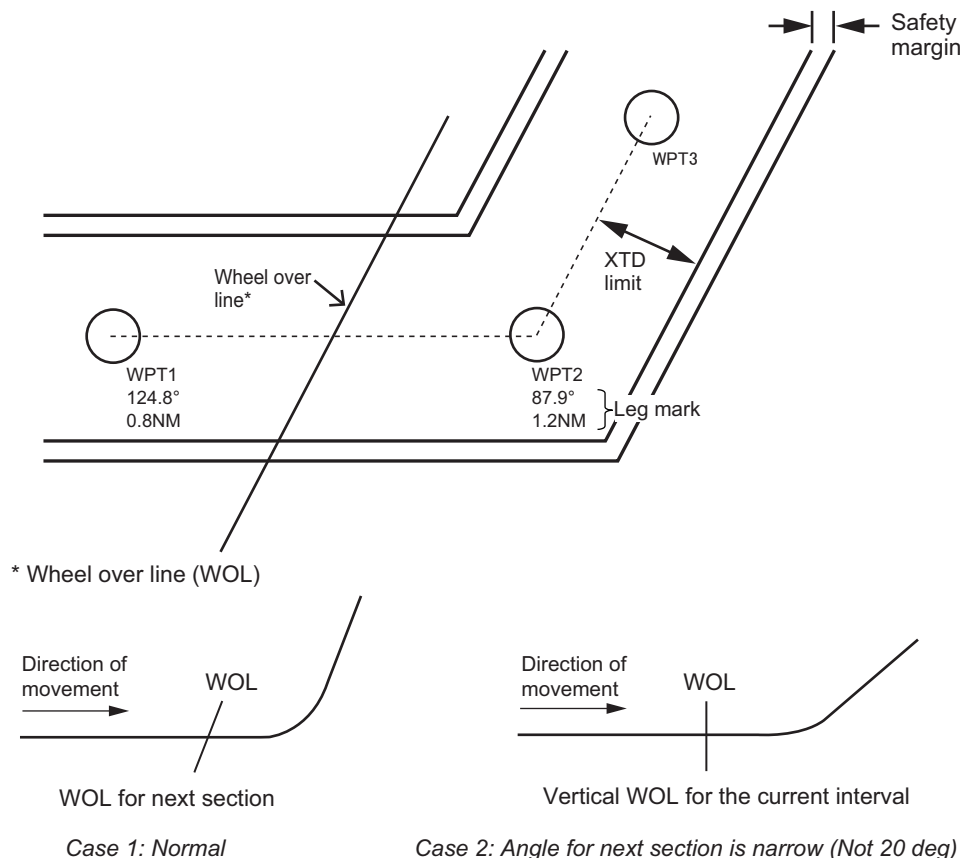
1. Open the menu then select the [6 CHART DISPLAY] and [1 OWN TRACK] menus.
2. Select [5 DELETE OWN TRACK].
3. Select the color to delete (A and B types), or the percentage of track to delete among [30%], [50%], [80%] and [ALL].
4. Close the menu.

5.14 Route Display

The route selected for navigation (in the chart mode) (see chapter 12) can be shown on the radar display. You can show or hide the entire route, and show or hide elements of the route (channel limits, safety margin, leg marks and wheel over line).



1. Right-click the [Mark] box then select [Map•Mark Menu] and [3 ROUTE].
2. Turn the route display on or off at [1 DISP ROUTE].
3. Turn the XTD limit, safety margin, leg marks and wheel over line displays on or off at [2 SEL ROUTE OBJECT].

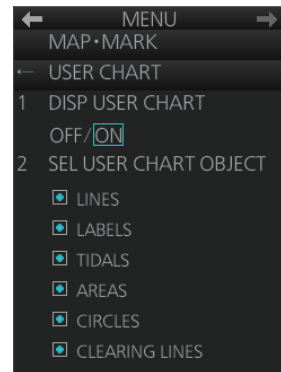


4. Close the menu.

5.15 User Chart Display

The active user chart can be shown in the chart radar mode. See chapter 13 for a description of the user chart.

1. Right-click the [Mark] box then select [Map•Mark Menu] and [5 USER CHART].
2. Show or hide the user chart on the radar display with [1 DISP USER CHART].
3. Show or hide the user chart objects on the radar display with [2 SEL USER CHART OBJECT].
4. Close the menu.



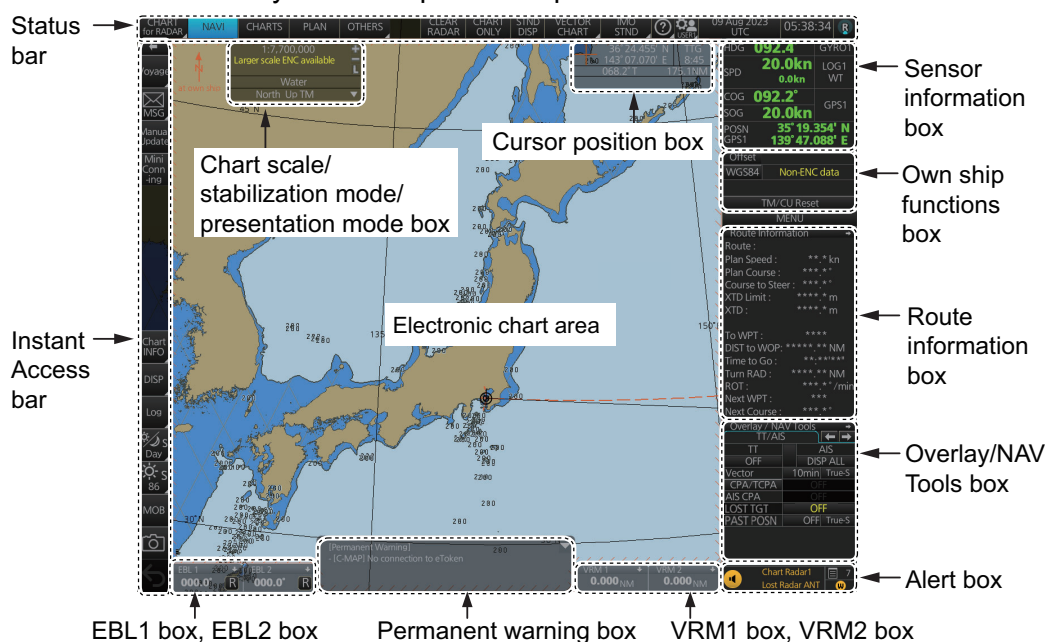
5. RADAR MAP AND TRACK

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6. CHART OVERVIEW

6.1 Chart Screen Overview

The ECDIS (Electronic Chart Display and Information Systems) screen is divided into several areas, as illustrated below. (The layout may be slightly different depending on your monitor's resolution.) The ECDIS operational area has no limitations. That is, high latitudes (85° and higher) are correctly displayed always. The ECDIS uses “orthographic” presentation for areas of high latitude and small chart scales. All other conditions use the “cylindrical equidistant” presentation.



*: High latitudes are not supported in RADAR mode.

- The **Status bar** provides for selection of display mode, chart format, IMO chart display; one-click restoration of IMO standard display, etc.
- The **Sensor information box** displays ship's speed, course and position and selects sensors.
- The **Own ship functions box** applies offset to the chart.
- The **Route information box** shows route and waypoint data, when a route is selected for navigation.
- The **Overlay/NAV Tools box** provides for setup of navigation-related functions.
- The **Alert box** shows operational and system alert messages.
- The **VRM boxes** measure the range to an object.
- The **Permanent warning box** displays chart-related warning messages.
- The **EBL boxes** measure the bearing to an object.
- The **InstantAccess bar™** provides quick access to functions such as brilliance adjustment, display palette and the chart-related menu. The contents change according to the display mode selected.
- The **Chart scale/stabilization mode/presentation mode box** selects the chart scale, stabilization mode and presentation mode.
- The **Cursor position box** shows the latitude and longitude position of the cursor and the TTTG to the cursor.
- The **Electronic chart area** shows the chart.

Note: If the display indications freeze, the buzzer sounds continuously. Restart the unit to restore normal operation.

6.1.1 Electronic chart area

This chart radar can use the following types of charts:

- S-57 (IHO)
- S-63 (IHO) (S-63 encrypted)
- C-MAP

The following information can also be displayed:

- Cursor (moved by trackball)
- Planned route
- EBL (Electronic Bearing Line) and VRM
- Own ship symbol with speed vector
- TT-acquired target from radar
- AIS object

Electronic charts

The electronic navigational charts, ENC or C-MAP vector format, are displayed in the electronic chart area.

The chart radar combines chart and navigational information. It should be noted that modern navigation systems (e.g., differential GPS) may offer more accurate positioning than what was used to position some of the surveys from which the electronic navigational chart was derived.

This chart radar is compatible with S57 release 3 ENC format charts. ENC charts are converted to SENC for use with the chart radar.

When you open a chart, it is displayed with the default scale, called the compilation scale. The details for the chart are displayed in the electronic chart area and these can be modified. You can change the chart scale with the ZOOM IN and ZOOM OUT functions, and the scale range is 1:1,000 - 1:70,000,000.

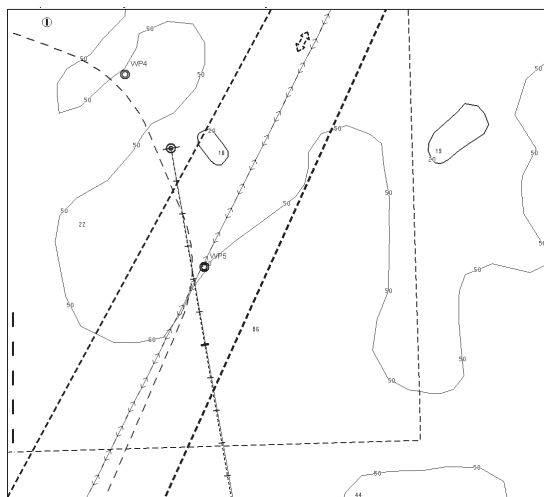
C-MAP vector format

The C-MAP charts require a contract with applicable provider. There are two types of C-MAP charts; C-MAP ENC SERVICE, which are officially recognized charts, and C-MAP PROFESSIONAL, which are charts from a private source and cannot be used as a substitute for paper charts under any condition. To emphasize this point C-MAP PROFESSIONAL charts are called "Non-ENC" charts in this manual.

Note: Some eToken dongles from the FEA-2xx7 can be used with this system. These are labeled "JeT FURUNO XXXXX". Contact your dealer for details.

This chart radar accepts the following C-MAP chart types: ENC SERVICE, PROFESSIONAL+, ENC+ SERVICE and ADMIRALTY ENC SERVICE.

C-MAP ENC SERVICE charts comply with the IHO's (International Hydrographic Organization's) S-57 Edition 3 product specification. When used in the chart radar, the ENC data improves the safety of navigation at sea.



What is ENC delivery?

ENCs can be distributed as ENC delivery or SENC delivery. Both deliveries can be used in this system.

In ENC delivery, charts are distributed directly from source like PRIMAR, IC-ENC, JHA, etc. They are delivered onboard in ENC format (using S-57 and S-63) then the charts are installed into the system.

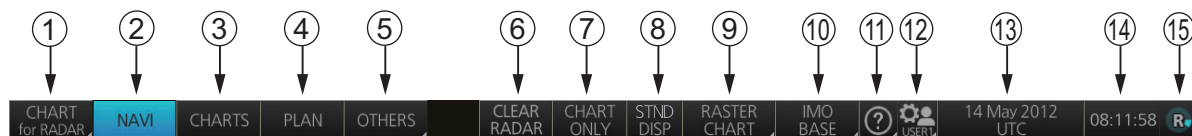
In SENC delivery, charts are converted from ENC to SENC before delivery to onboard and then installed into the system. A C-MAP ENC delivery is SENC delivery.

Important notices

- If you are using both services (ENC and SENC deliveries) having the same chart name installed into the system through both deliveries, priority of displaying the chart is in ENC delivery.
- Chart updates for ENC delivery are only for charts of ENC delivery and chart updates for SENC delivery is only for charts of SENC delivery. You have to keep charts up-to-date separately.
- If you change from ENC delivery to SENC delivery, remove old charts from the system before installing charts from new delivery.

6.1.2 Status bar

The Status bar mainly provides for selection of display mode, chart type and IMO chart display setting.



No.	Button name	Description
1	Display mode	Selects the display mode: [RADAR], [CHART for RADAR], or [CONNING for RADAR]*. *Optional specification.
2	NAVI	Selects the Voyage navigation mode.
3	CHARTS	Goes to the Chart maintenance mode.
4	PLAN	Selects the Voyage planning mode.
5	OTHERS	Sets system in harbour mode.
6	CLEAR RADAR	Hides radar echoes and TT/AIS symbols. Available only when radar overlay is active, or when there is at least one TT/AIS symbol displayed.
7	CHART ONLY	Shows only the chart, when left button is pressed and held down.
8	STND DISP	Restores the IMO standard display instantly.
9	Chart priority	No use.
10	Chart database	Selects the pre-defined presentations of ENC content: IMO BASE, IMO STND or IMO ALL. CUSTOM appears when the symbols selected or deselected on the [Chart Display] menu do not match the preset conditions for IMO BASE, IMO STND or IMO ALL.
11		Displays the operator's manual, chart program no. and system information.
12	 Settings	- Manages user profiles. - opens the [Settings] menu. - The number on the button indicates the profile number in use.
13	Date	- Displays the date. - Selects the time to use, local or UTC. - Sets the time difference between local and UTC (to use local time).
14	Time	Displays the time, local or UTC.
15	Working Indicator 	- Rotates clockwise if the system is working properly. If it is not spinning the system is not working. Shortly after it stops spinning the buzzer sounds. Reset the power to restore normal operation. - If the primary display mode is specified during the installation, the first letter of the mode name appears at the center of the working indicator as follows: C: Conning, E: ECDIS, R: Radar. The letter can be clicked to return to the primary display mode.

How to operate the buttons on the Status bar

The Status bar has two types of controls: toggle button and drop-down list button. You operate the buttons with the trackball module.

Button type	Operating procedure
Mode button	
A mode button selects the chart operating mode (see section 6.3). The background color of a mode button is light-blue when its chart operating mode is enabled; gray when disabled. The [NAVI] button is an example of a mode button.	NAVI OFF (gray) Click button. NAVI ON (light-blue)
Drop-down list button	
A drop-down list button provides a list from which to select an option related to the label on the button. The [Chart Database] button is an example of a drop-down list button. See the right figure. A drop-down list button has a list status indicator (a triangle) whose position changes according to list status. IMO BASE List closed IMO STND List opened	IMO STND Click button. IMO STND IMO BASE IMO STND IMO ALL

6.1.3 InstantAccess bar™

The InstantAccess bar™ runs vertically along the left edge of the screen. The bar contains all the operating functions related to the selected chart operating mode (Voyage planning, Voyage navigation and Chart maintenance). The bar is divided into two sections, upper and lower. The buttons in the lower section are common to all modes. A button with a triangle mark at its bottom right corner indicates a button with multiple functions.



Button name	Description
Voyage navigation mode bar	
←	Minimize the InstantAccess bar™. To restore the maximized bar, click anywhere on the bar. 
Voyage	[Route]: Selects/deselects routes, and moves route to Voyage planning mode (for editing). [User Chart]: Selects/deselects user chart for monitoring. [Monitor INFO]: Shows the [Monitor Information] dialog box. [Stop Monitor]: Stops monitoring of route, user chart. [Instant Track]: Creates a temporary track to return to or make a temporary detour from the monitored course.
	Processes AIS Safety and Navtex messages. If you have unread Navtex or Safety messages, the icon changes as shown right; "N" for unread Navtex, "S" for unread Safety, "S/N" for unread Safety and Navtex. 
Manual Update	Shows the menu for manual update of chart objects.
Mini Conning	Shows or hides the mini conning display.
Chart maintenance mode bar	
←	Minimizes the InstantAccess bar™.
Gate-1	Automatically installs selected charts and their licenses. Requires presetting at installation. Does not appear unless the presetting is done.
AUTO Import	Loads charts automatically.
Manage Charts	Deletes charts; installs (loads) charts manually.
Cell Status	Finds cell status.
License	Enters license information.
Public Key	Shows the current public key. The public key changes each time a new one is installed.
System	Functions for chart synchronization and chart data management. SYNC Config selects the units to synchronize. SYNC Status checks synchronization status. Gate-1 Config. manages Gate-1 charts. Does not appear unless the presetting mentioned at [Gate-1] above is done. Reconvert reconverts SENC charts. Clear Charts removes chart data.
Voyage planning mode bar	
←	Minimizes the InstantAccess bar™.
Planning	Creates and edits routes and user charts.
Report	Displays route and user chart reports.

6. CHART OVERVIEW

Button name	Description
Guide Box	Shows or hides the guide box, which provides range and bearing measurement between waypoints when creating a route. Note: Range and bearing between waypoints can be calculated using either [Rhumbline] or [Great Circle]. Select the appropriate method from the [Guide Box] drop-down list in the [Geometry] section of the [NAV TOOLS] menu.
Manage Data	Manages routes and user charts. [Route]: Imports, exports, deletes routes. [User Chart]: Deletes user charts. [Data Import]: Imports route, user chart created with FEA-2x07 ECDIS.
SAR	Shows the [Search and Rescue Settings] dialog box.
Common bar	
Chart INFO	Provides chart information. [Chart Legend]: Shows chart legend, with your vessel at the center, in the Voyage navigation mode. [Viewing Dates]: Sets Display date and Update Review dates. [Chart 1]: Displays an overview of ECDIS chart symbols.
DISP	[SET]: Shows the [Basic Setting] menu, [Chart Display] menu, [Symbol Display] menu, [Chart Alert] dialog box. [TWO DISP]: Splits the screen in two, vertically or horizontally, in the Voyage navigation mode. [NtoM]: Shows or hides the Notices to Mariners (NtoM).  : Shows or hides the software keyboard.
Log	Displays Update log (ENC, C-MAP), Event log* (user event, POSN event), NAV log (Voyage, Details, Chart Usage), Target log (Danger Target), and Route Transfer log. *: Voyage navigation and Voyage planning modes.
 OR  Palette	Selects a color palette, day, dusk or night. The S or L at the right edge of the label indicates how the color palette selection is shared, among the units of the system (S) or locally (L). The default setting is "S". See section 22.7.
 OR  BRILL	- Adjusts the brilliance of the monitor. - Adjusts the backlighting for the control unit. (CHART for RADAR mode) The S or L at the right edge of the label indicates how the brilliance/backlighting selection is shared, among the units of the system (S) or locally (L). The default setting is "S". See section 22.7.
MOB	Inscribes the MOB (ManOverBoard) mark.
 Capture	Takes a screenshot.
 UNDO	Restores previous condition in route and user chart creation.

How to operate the buttons on the InstantAccess bar™

The InstantAccess bar™ has four types of buttons: toggle button, drop-down list button, slider bar button, and specialty button. (The [MOB], [Capture] and [UNDO] buttons are specialty buttons that provide a single-action function.) The buttons can be operated with the trackball module or the **InstantAccess** knob. This section shows you how to operate the buttons with the **InstantAccess** knob.

Toggle button	Drop-down list button	Slider bar button

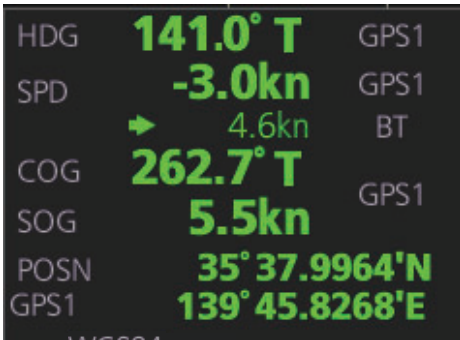
1. Push the **InstantAccess** knob to enable its use with the InstantAccess bar™.
2. Rotate the **InstantAccess** knob to select a button. The background color of the button selected is light blue.
3. Do one of the following depending on button type.
 - **Toggle button**: Push the knob to select setting.
 - **Drop-down list button** or **slider bar**: Rotate the knob to select an item or adjust the slider bar. Push the knob to confirm your selection or setting.

Note 1: You can use the **ESC** key to go back one step in the current operating sequence.

Note 2: The **InstantAccess** knob can only adjust the slider bar on the InstantAccess bar™.

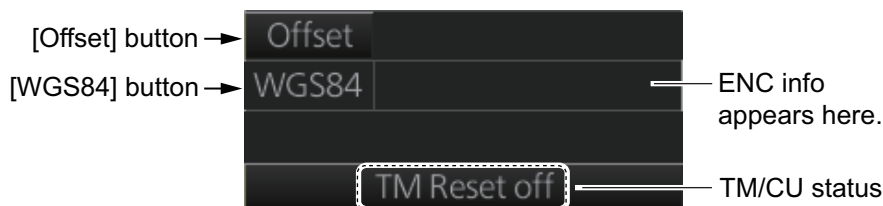
6.1.4 Sensor information box

Sensor information box displays the sensor data. When the user-selected sensor fails, the system automatically selects another sensor. When this occurs, the color of the sensor name changes according to the sensor status. For details, see section 1.11.

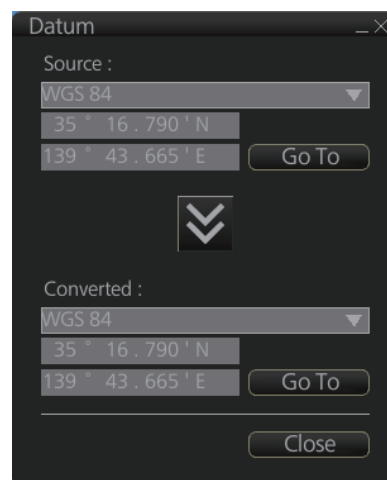


6.1.5 Own ship functions box

The own ship functions box shows information about own ship, enables offset and TM reset.



- **[Offset]** button: See section 16.7.1.
- **[WGS 84]** button: Convert position data between datum; go to selected position on the current chart. Click the button to display the dialog box shown in the right figure. To convert a position from one datum to another, select the datum source at the [Source] pull-down list and enter position. Select the datum to convert to at the [Converted] pull-down list then click the  button. The position on the chart selected is shown below the [Converted] pull-down list. To go to a position, click a [Go To] button.



- **ENC info:** ENC chart info appears here.
No indication: ENC chart is currently displayed.
"Non-ENC data": Non-official ENC material, in yellow characters. See section 7.18.
- **TM/CU status:**
"TM/CU Reset": True motion reset is active. (Chart is stationary and own ship moves on the chart.)
"TM Reset off": When dragging the chart; true motion is OFF. To restart true motion, click the indication.
"Ship off screen": Ship is out of the display area.

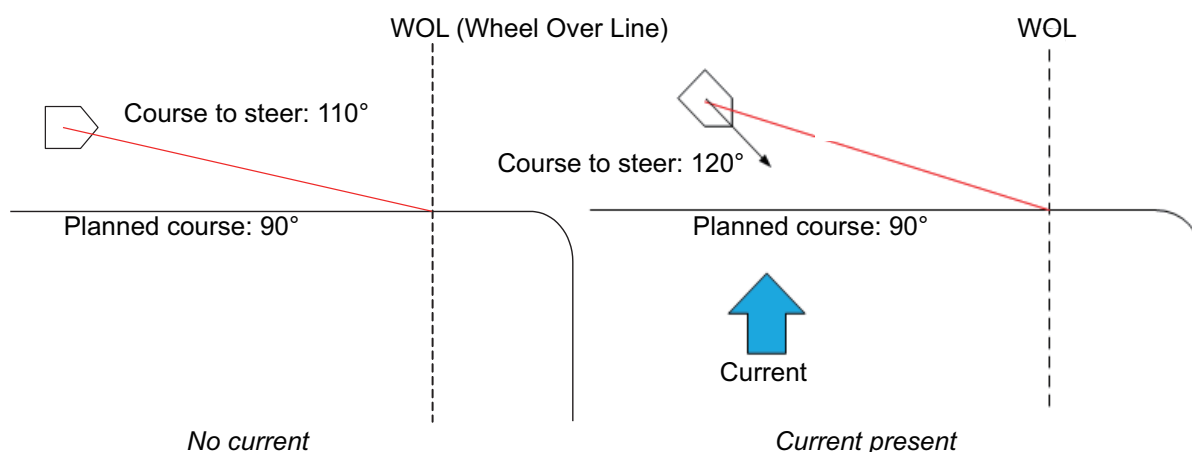
6.1.6 Route information box

Asterisks appear in data locations when no route is selected for navigation.

- [Route]: Name of monitored route.
- [Plan Speed]: Planned speed to approach "To WPT".
- [Plan Course]: Planned course between previous WPT and "To WPT".
- [Course to Steer]: Calculated set course to follow the monitored route, including XTD, drift and gyro error compensations. See the figure below. If no tidal current information is entered, asterisks appear here.
- [XTD Limit]: Cross track distance, set when planning a route. The XTD limit figure can be shown in meters (m) or nautical miles (NM). Shown in white when the vessel is within the designated "off-track" limit. Shown in red when the vessel exceeds this threshold.
- [XTD]: Perpendicular distance the ship is from the intended track. The XTD figure can be shown in meters (m) or nautical miles (NM). Click this box, then select [XTD] and unit desired, or open the menu and select desired unit with [unit of "XTD"] in the [Route Information] menu.
- [To WPT]: The waypoint that the ship is approaching.
- [DIST to WOP] (Wheel Over Point): Distance to the point where rudder order for course change at "To WPT" is given.
- [Time to Go]: Time to go to WOP.
- [Turn RAD]: Planned turning radius at "To WPT".
- [ROT]: Calculated rate of turn that is based on current speed and planned turning radius.
- [Next WPT]: The WPT following the "To WPT".
- [Next Course]: Next course (in degrees).

Route Information →	
Route :	Untitled1
Plan Speed :	20.0 kn
Plan Course :	178.3 °
Course to Steer :	176.7 °
XTD Limit :	185.0 m
XTD :	174.7 m
To WPT :	2
DIST to WOP:	2.84 NM
Time to Go :	0: 3'24"
Turn RAD :	0.80 NM
ROT :	***.*/min
Next WPT :	3
Next Course :	197.9 °

Course to steer

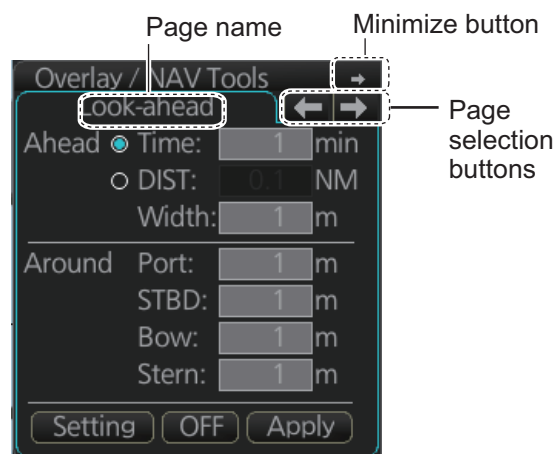


6.1.7 Overlay/NAV Tools box

The [Overlay/NAV Tools] box sets up the following objects and consists of the following pages.

- TT•AIS
- Echo*¹
- Parallel index lines
- Range rings
- Predictor (predicts ship's future movements)
- Under the keel clearance
- Anchor watch
- Look-ahead*²
- Curved EBL*³

See chapter 15 for information about objects other than TT•AIS.



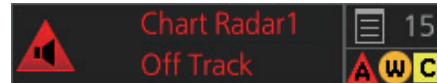
*1: Available only when the Echo page is enabled at installation. Not available for B types.

*2: Always active when Back-up ECDIS mode is enabled.

*3: Available only when a EC-3000/3005 with TCS functionality (optional specification) is connected to the same network.

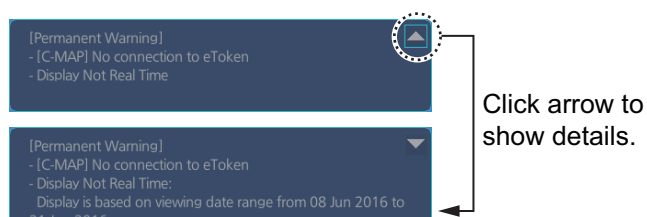
6.1.8 Alert box

The [Alert] box shows operational and system alert messages. See chapter 20.



6.1.9 Permanent warning box

The permanent warning box displays chart-related warning messages. Click the arrow to show details. Click the arrow again to minimize the box.



6.1.10 EBL, VRM boxes

The EBL measures the bearing to an object, and the VRM measures the range to an object. See section 6.10.

6.1.11 North mark

The north mark appears at the top left of the Chart for Radar display, is always visible, and points in the northerly direction. At high latitudes where north is not in a set direction, the north mark appears with the text "at own ship" or "at center" below the mark to show the reference point.

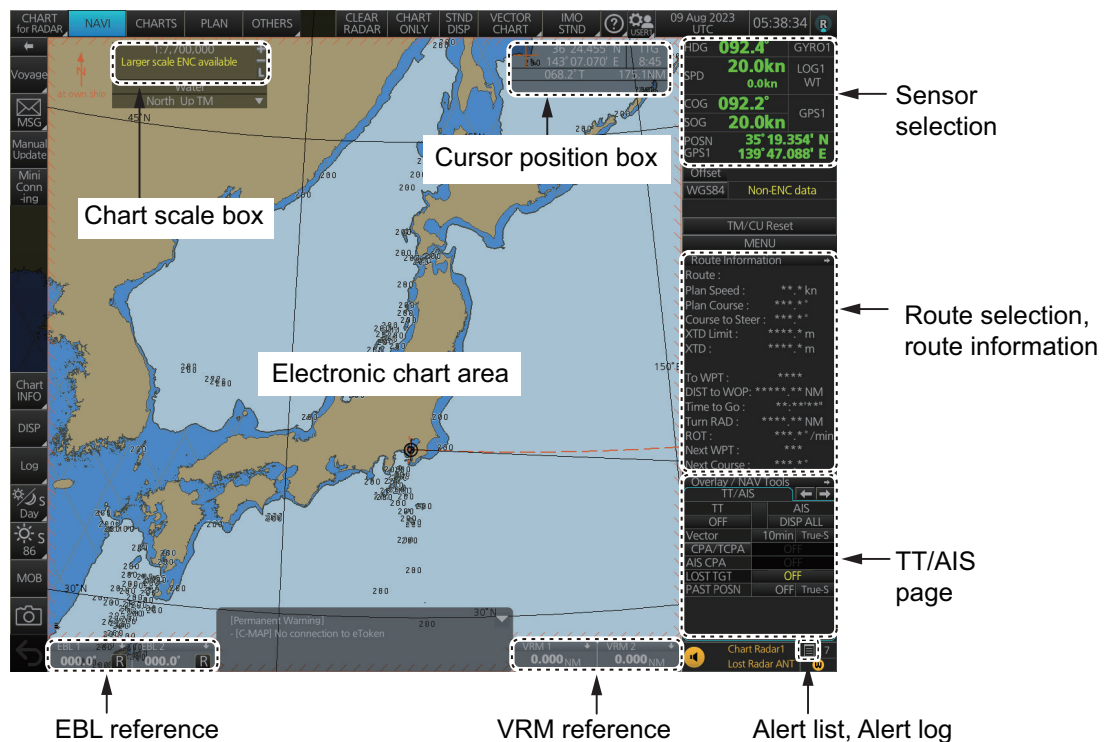


North mark

- "at own ship": Shown when your vessel is displayed on-screen. North is shown with your vessel as the reference point.
- "at center": Shown when your vessel is not displayed on-screen. North is shown with the center of the screen as the reference point.

6.1.12 Context-sensitive menus

Context-sensitive menus are available at the locations shown below. Right-click the applicable area then select the appropriate item from the menu. The availability of the context-sensitive menu depends on the mode in use, as shown in the table below.



6

Item	Functions	Mode and availability		
		NAVI	CHARTS	PLAN
Chart scale box	Drop-down list of chart scales.	Yes	Yes	Yes
Cursor position box	Switch cursor displays.	Yes	Yes	Yes
Sensor selection	Select sensors.	Yes	Yes	Yes
Route selection, route information	Select /unselect route for monitoring*; Move to plan*; Select user chart for monitoring*; Monitor INFO box*; Stop route monitoring*; XTD	Yes	Yes (XTD only)	Yes (XTD only)
TT, AIS page	Access TT, AIS functions.	Yes	Yes	Yes
Alert list, Alert log	Open alert list, alert log.	Yes	Yes	Yes

Item	Functions	Mode and availability		
		NAVI	CHARTS	PLAN
VRM reference	Select VRM reference; offset (heading or north).	Yes	Yes	Yes
EBL reference	Select EBL reference; offset (heading or north).	Yes	Yes	Yes
Electronic chart area	Own ship mark (or cursor position*) to screen center; object info; chart legend; hide/show chart cell; manual update*; show/hide range rings; sleep all activated targets; divider, hide MOB, [Message] dialog box.	Yes	No	Yes*

* NAVI mode only

6.1.13 How to enter alphanumeric data

On some screens it is necessary to enter alphanumeric data. The data can be input two ways: software keyboard or trackball.

Alphanumeric data entry from the software keyboard

A software keyboard is also available for entry of alphanumeric data. Do as follows to use the software keyboard. Display the keyboard before opening menus.

1. On the InstantAccess bar™, press the [DISP], [] and [ON] buttons to show the software keyboard. The [BS], [Enter], [↑], [↓], [←], [→] and [Space] on the keyboard function the same as those keys on the keyboard of the Control Unit.



2. To switch between the alphabet keyboard and symbols keyboard, click the [!\$&] key.



Alphabet keyboard



Symbols keyboard

3. Click the input box.
4. Click appropriate keys and finally click the [Enter] key.

To erase the software keyboard, click the X button at the top right corner of the keyboard.

Alphanumeric data entry with the trackball module

The trackball module can also be used to enter alphanumeric data.

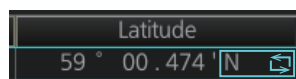
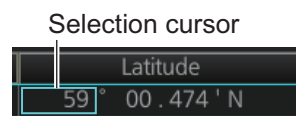
1. Put the cursor in the input box. Up and down arrows appear at the right side of the box.
2. Enter data by one of the methods shown below.
 - Spin the scrollwheel to set data. Upward to decrease the value; downward to increase the value.
 - Click ▲ to increase the value; ▼ to decrease the value.



How to enter latitude and longitude data with the trackball module

The trackball module can also be used to enter latitude and longitude data.

1. Put the cursor in the input box. A selection cursor (light-blue) appears.
2. Enter data by spinning the scrollwheel. Upward to decrease the value; downward to increase the value.
3. To switch coordinate between N and S and vice versa, put the cursor at the right edge of the input box. Dual arrows appear
4. Click to switch the coordinates. The method to switch E to W and vice versa is the same.

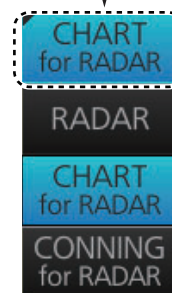


6.2 How to Select a Display Mode

Click the display mode button at the far left side of the Status bar then click [RADAR], [CHART for RADAR] or [CONNING for RADAR]* to select a display mode.

*Optional specification.

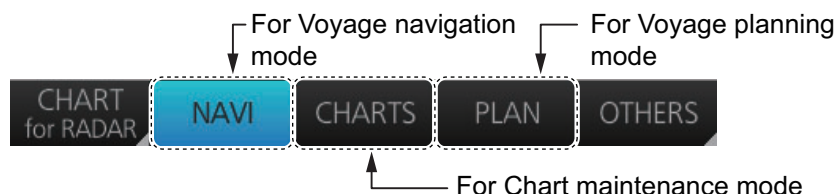
Display mode button



6

6.3 How to Select the Chart Operating Mode

The chart display has three chart operating modes: Voyage navigation, Chart maintenance and Voyage planning. Select a mode from the Status bar with the [NAVI], [CHARTS] and [PLAN] buttons. The background of the button of the active mode is light-blue.



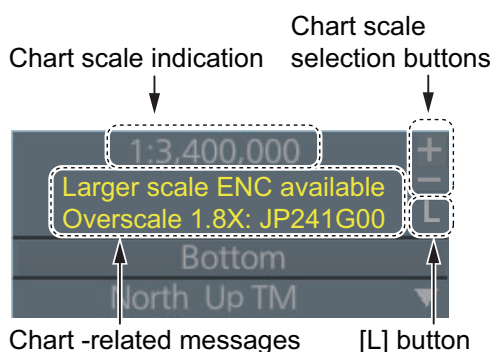
Note 1: When switching between the Voyage navigation and Chart maintenance modes it may take several minutes to read the chart when using C-Map charts or there are many charts installed.

Note 2: If the equipment accepts no key operation after switching to the Chart maintenance mode, reset the power.

6.4 How to Select the Chart Scale

When you open a chart it is displayed with the default scale, called the compilation scale. To change the chart scale, do one of the procedures shown below. The scale range is 1:1,000 to 1:70,000,000.

- Use the **RANGE** key on the Control Unit.
- Click the chart scale selection buttons in the Chart scale box.
- Right-click anywhere inside the Chart scale box to show a drop-down list of chart scales.
- Put the cursor anywhere on the chart and spin the scrollwheel.
- Use the [L] button in the Chart scale box. Appears under certain conditions. See section 8.2.



The table below lists the chart related messages and their meanings.

Message	Meaning
Display Not Real Time*	Displayed date is not the current date.
Non-ENC data	ENC non-compatible chart in use.
Larger scale ENC available	Larger scale available at current position (TM reset ON) or cursor location (TM reset OFF).
MAG	Chart display magnification. In the example below the magnification is 1.98. Appears with monitor size 32 inch or higher.
Overscale	Scale too large.
RM(OFF)	Relative motion turned off when the chart is scrolled or the trackball is operated.

*: Shown as "Display Not Real Time: display is based on viewing date range from (start of date range) to (end of date range)" when the permanent warning dialog is maximized.

6.5 How to Select the Presentation Mode, Stabilization Mode

The presentation mode depends on the chart operating mode, as shown in the table below.

	Voyage navigation mode	Voyage planning mode
North up TM	Yes	Yes ^{*2}
North up RM	Yes	No
Course up TM	Yes	Yes ^{*2}
Course up RM	Yes	No
Route up TM ^{*1}	No	Yes ^{*2}
Route up RM ^{*1}	Yes	No
Head up RM	Yes	No

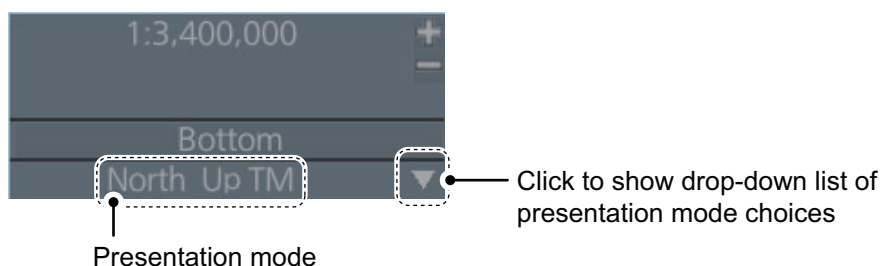
^{*1}: Available only when a route is being monitored.

^{*2}: "TM" not shown in the presentation mode indication.

6.5.1 How to select a presentation mode

There are two methods to select a presentation mode:

- Click the presentation mode indication to cycle through the presentation modes.
- Click the ▼ indication to show a drop-down list of presentation modes, then click the mode you want to use.



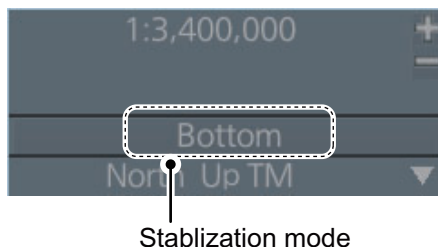
Description of presentation mode

Presentation mode	Description
North Up	North (0°) is the top-center of the screen.
Course up	Course is the top-center of the screen (at the time of selection)
Route Up	The planned course for a route being monitored is the top-center of the screen. If route monitoring is disabled, Route-up mode automatically changes to Course-up mode.
Head Up	Current heading is the top-center of the screen
TM (True Motion)	Own ship mark moves in relation to actual vessel movement, chart is displayed in a fixed orientation.
RM (Relative Motion)	Own ship mark is fixed at center of screen, chart moves in relation to vessel movement.

6.5.2 How to select a stabilization mode

Own ship and all targets can be [Water] (sea stabilized) or [Bottom] (ground stabilized), in any presentation mode. The stabilization mode is synchronized with all FMD-3xxx and FAR-3xxx units on the same network.

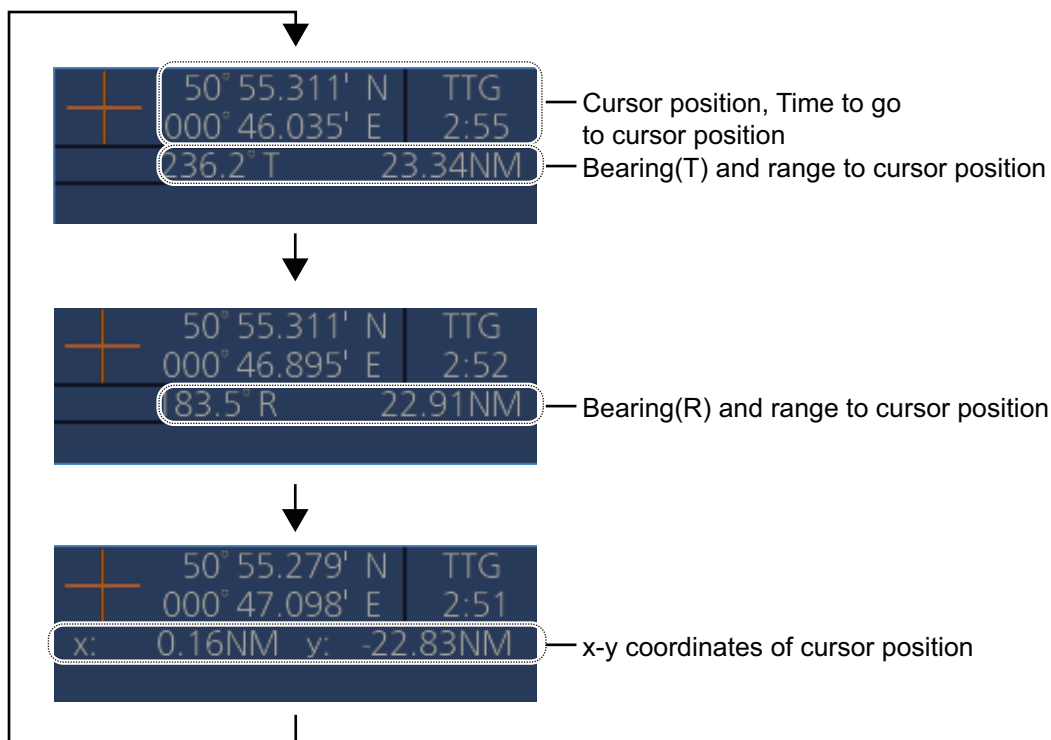
To select the stabilization mode, click the stabilization mode box to select [Water] or [Bottom].



6.6 Cursor Position Box

The Cursor position box shows

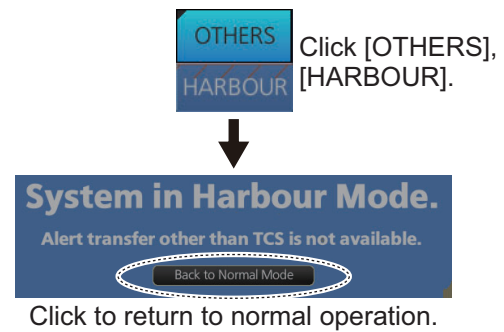
- Cursor position in latitude and longitude
- Time to go to the cursor position
- The bearing (True or Relative) and range to the cursor position, or x-y coordinates of cursor position. Click the bearing and range indication or x-y coordinates indication to switch the indication, in the sequence shown below.



6.7 The Harbour Mode

The Harbour mode is available to stop alert transfer from the chart system to BNWAS for alerts other than a TCS alert. Use this mode when the chart system is not required, like in a harbour.

To go to the harbour mode, first click the [OTHERS] button on the Status bar in the [CHART for RADAR] mode then click [HARBOUR].

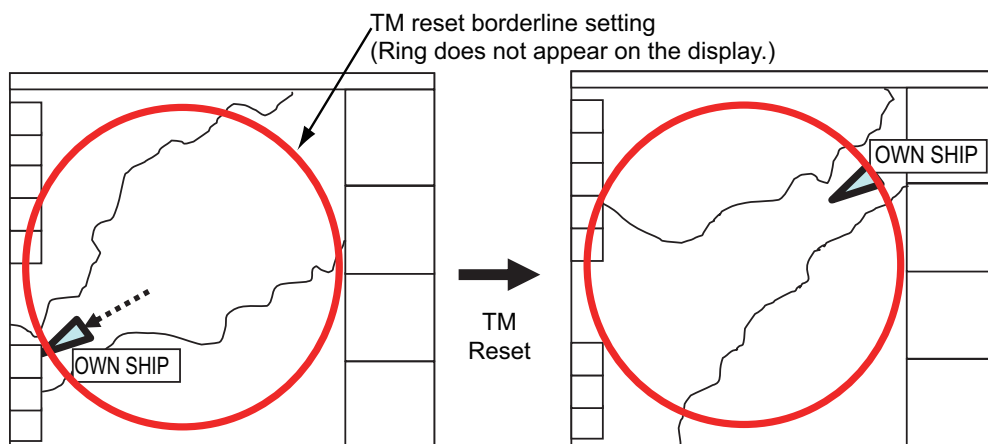


To return to normal operation, click [Back to Normal Mode].

Note: The harbour mode is automatically released when switching the operating mode (radar/chart radar/conning).

6.8 True Motion Reset

In the true motion mode, the chart is stationary and own ship moves on the screen. With TM reset active, own ship moves until it reaches the true motion reset border-line(s), then the chart is redrawn and own ship jumps back to an opposite position on screen based on its course. (This resetting can also be done manually by clicking the [TM/CU Reset] button.) When the TM reset function is active, "TM/CU Reset" appears at the right side of the display.



How to enable, disable automatic TM reset

To enable automatic TM reset, click the [TM Reset off] indication at the right side of the display to show [TM/CU Reset].



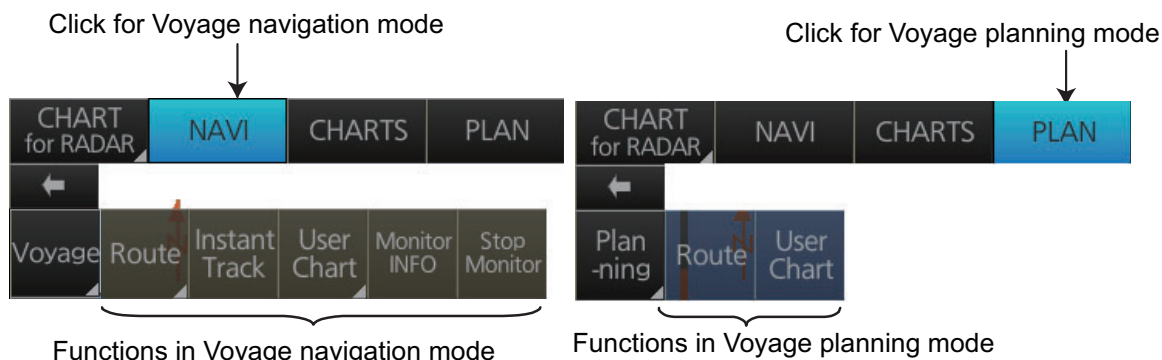
Click

When the TM reset is disabled, change the chart scale with the scrollwheel and scroll the chat by drag and drop. The own ship functions box shows [TM Reset off]. When own ship moves off the screen the box shows [Ship off screen]. The TM reset is activated manually by clicking the [Ship off screen] button.

How to set the true motion reset borderline

You can set the limit for TM reset (in percentage) on the [Basic Setting] page. See section 8.3.2.

6.9 How to Control Route and User Charts in Voyage Navigation and Voyage Planning Modes

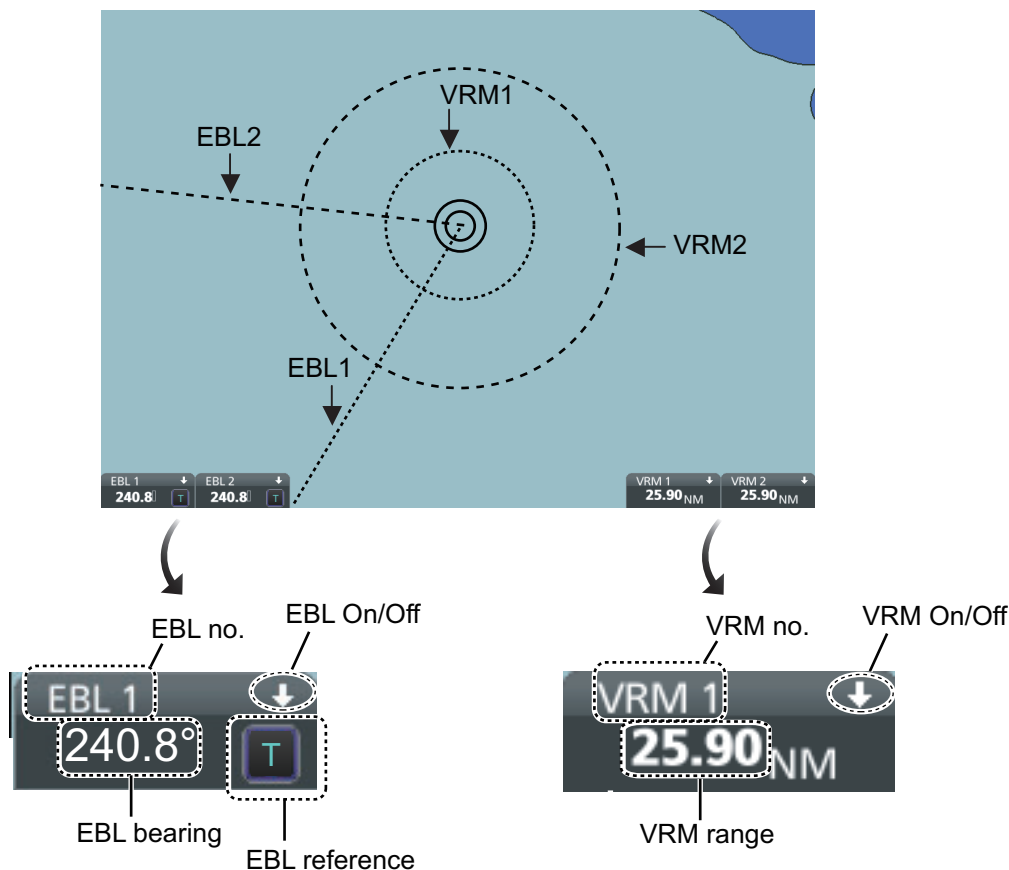


Click the appropriate chart mode button [NAVI] or [PLAN] at the top of the display to go to respective mode. For the Voyage navigation mode, click the [Voyage] button then click the button corresponding to the action to take. For the Voyage planning mode, click the [Planning] button followed by the [Voyage] button to select a route, or [User Chart] button to select a user chart.

Voyage navigation mode functions
[Route]: This button has three functions: • [Select]: Selects the route to monitor. • [Unselect]: Deselects monitored route. • [Move to Plan]: Moves monitored route to Voyage planning mode (for editing).
[Instant Track]: Creates a temporary track to return to or make a temporary detour from the monitored course.
[User Chart]: This button has one function. • [Select/Unselect]: Selects and unselects user charts from monitoring regardless of route being monitored.
[Monitor INFO]: Opens the Monitor Information dialog box, to view monitored route, linked user chart and monitoring user chart information.
[Stop Monitor]: Stops monitoring a route and user charts.
Voyage planning mode functions
[Route]: Shows the [Route Plan] dialog box to create or edit a route.
[User Chart]: Shows the [User Chart] dialog box to create or edit a user chart.

6.10 How to Use the VRM and EBL

The VRM measures the range to an object and the EBL measures the bearing to an object. There are two each of VRMs and EBLs. The lengths of the dashes on the EBL2 and VRM2 are longer than those of the EBL1 and VRM1 to distinguish them. The color of the VRMs and EBLs is orange.



6.10.1 How to hide/show an EBL, VRM

Control Unit: Press the **EBL** or **VRM** key to hide or show respective marker.

Trackball module: Click the arrow on an EBL or VRM box to hide the respective marker. To redisplay the marker, click the minimized box.

6.10.2 How to measure the range and bearing

Range: Put the cursor on the VRM then drag the cursor until the VRM is on the inner edge of the object.

Bearing: Put the cursor on the EBL then drag the cursor until the EBL bisects the object.

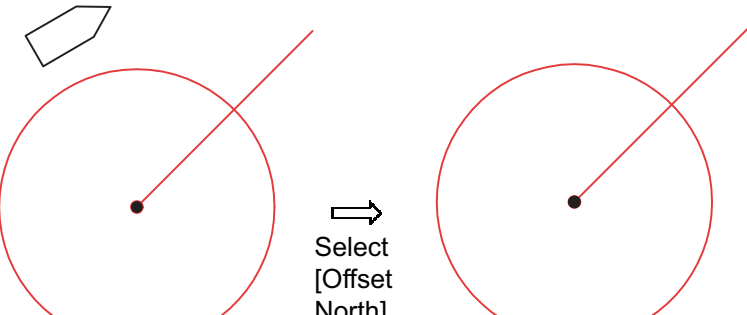
6.10.3 How to select bearing reference

The EBL bearing reference can be true or relative. Click the EBL reference indication to display T (True) or R (Relative).

6.10.4 EBL, VRM functions available with the context-sensitive menu

The EBLs and VRMs have additional functions that are accessed from the context-sensitive menu. Right-click any VRM or EBL box to show the context-sensitive menu.

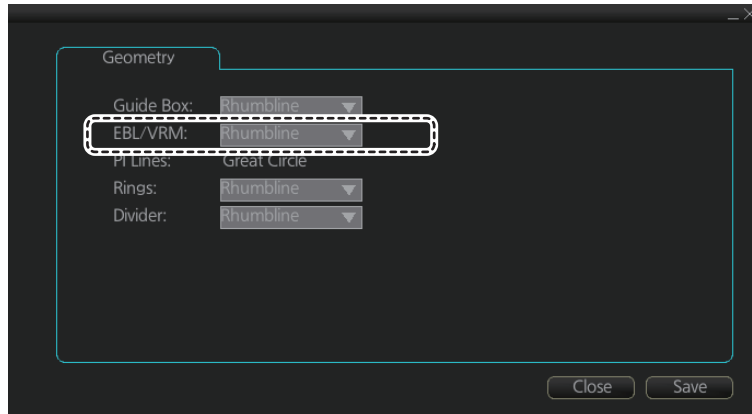


Function	Description
[Centered]	Centers the origin of the EBL and VRM on the current position.
[Ground]	Anchors the EBL and VRM to ground; neither the EBL or VRM move with ship's movement.
[Offset HDG]	 Drag and drop EBL, VRM on desired location. When vessel changes course, the EBL, VRM move so that the range (L) to their centers stays fixed.
[Offset North]	 Drag and drop EBL, VRM on desired location. The EBL, VRM move to keep the angle from North to the center of the EBL, VRM, even if the vessel changes course. The distance to the center of the EBL, VRM is fixed.

6.10.5 How to select the calculation method for EBL and VRM

The bearing for EBL and range for VRM can be calculated using either Rhumbline or Great Circle. To select the calculation method, do the following:

1. Open the menu then select [NAV Tools] and [Geometry]. The [Geometry] settings page appears.

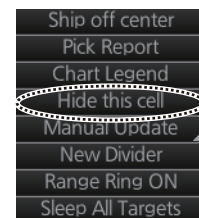


2. Click the triangle at [EBL/VRM] to show the drop-down options.
3. Select [Rhumbline] or [Great Circle] as appropriate.
4. Click [Save] to apply the changes, then click [Close] to close the menu.

6.11 How to Hide/Show the Chart Cell

You can temporary hide/show the chart cell that is currently shown.

1. Get into the Voyage navigation or Voyage planning mode, then right-click the screen to show the context-sensitive menu.
2. Select [Hide this cell] to hide the chart cell that is currently shown.
3. To show the hidden chart cell, right-click the screen to show the context-sensitive menu, then select [Reset hidden cell].



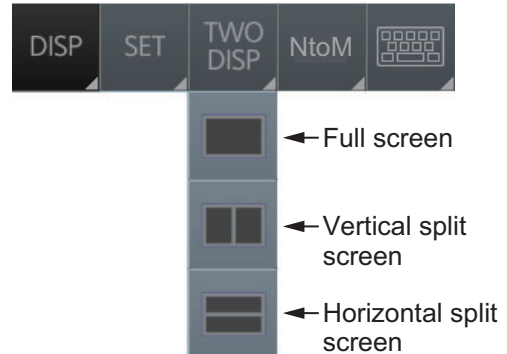
Context-sensitive menu
(Voyage navigation mode)

6.12 Split Screen

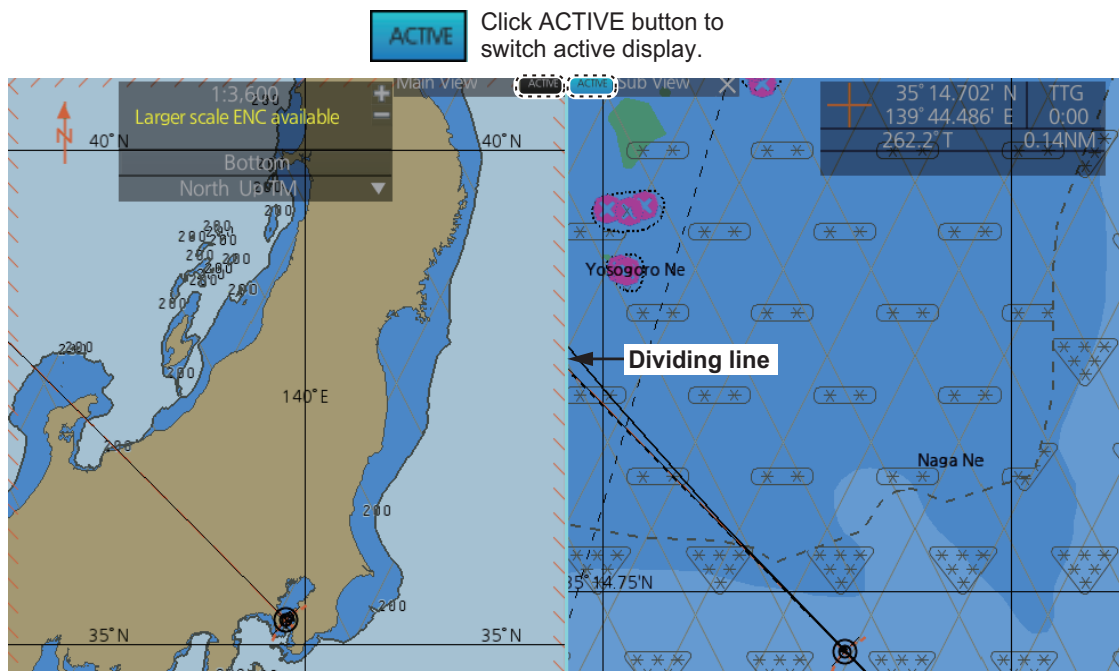
You can split the screen in two, horizontally or vertically, in the [CHART for RADAR] mode, Voyage navigation display.

6.12.1 How to activate, deactivate the split screen

To activate the split screen or return to the full screen, click the [DISP] and [TWO DISP] buttons on the InstantAccess bar™ to show the choices for screen division. Click the screen division desired.



The example below shows the vertical split screen. The active display can be switched by clicking an [ACTIVE] button at the top of the display. The dividing line between the main and sub views cannot be moved.



6.12.2 Function availability

Item (CHART for RADAR mode)	Viewable		Operable	
	Main	Sub	Main	Sub
AIS object	Yes	Yes	Yes	Yes
TT	Yes	Yes	Yes	Yes
EBL, VRM	Yes	Yes	Yes	Yes
Parallel index lines	Yes	Yes	Yes	Yes
Divider	Yes	Yes	Yes	No
Range rings	Yes	Yes	Yes	No
Anchor watch	Yes	Yes	Yes	No
Danger highlight	Yes	Yes	Yes	No
Chart display	Yes	Yes	Yes	No

6.12.3 Split screen usage characteristics

- If the sub view is not displayed correctly, restore the full screen display then try to activate the split screen again.
- The display may not be updated when switching to the Voyage planning mode. If this occurs, switch to the Voyage navigation mode, restore the split screen display then return to the Voyage planning mode.
- The own ship mark may not appear at the screen center when releasing the split screen display. If this occurs, click the indication "TM/CU Reset" at the top right position on the screen to show the own ship mark at the screen center.
- The TM reset feature only works on the active display. To return the own ship mark to the screen center, click the indication [TM/CU Reset] at the top right position on the screen.
- The sub view can use a location and chart scale different from the main view.
- The chart scale related messages (overscale, larger ENC available, etc.), which appear beneath the chart scale indication, show only on the main view.

6.13 Datum

6.13.1 General

Datum is a mathematical model of the earth based on which a sea chart is produced. If the datum of a position sensor and that of a sea chart are different, a transformation has to be made somewhere in the system. Not doing so can result in errors of several sea miles. The difference between two datum is never constant, but depends on position. This means that the difference between WGS-84 and local datum, generally used in paper charts, is not generally valid with electronic sea charts.

6.13.2 Paper charts

Datum used in paper charts have been traditionally national datum for historical reasons. Many paper charts do not have a marked datum, therefore compatibility with electronic charts may be complicated. In some paper charts, the correction terms are printed in lieu of datum, for correction of the WGS-84 system satellite locations. The correction terms are usable but only with the paper chart in question.

6.13.3 Electronic sea charts

The ENC vector material has to be produced by a National Hydrographic Office in the WGS-84 datum.

6.13.4 Positioning devices and datum

In early days of electronic positioning devices, datum received little attention because the commonly used systems utilized special charts (like Decca charts). Later on, data output was added to these systems, but still no attention was paid to datum and the position errors were considered as an inaccuracy of the system. With the spread of the GPS, however, datum has become better known. An accurate position is of no value if co-ordinates are in a wrong datum. GPS satellites utilize the WGS-84 datum.

6.13.5 Chart radar and datum

The chart radar uses ENC material, produced to standards using WGS-84 datum. Positioning devices connected to the chart radar must work in the WGS-84 datum. IMO requires that the chart must give an alert if the datum of a positioning device is not the WGS-84.

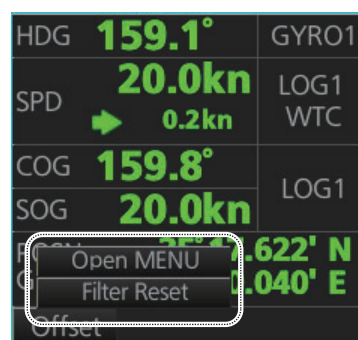
6.14 How to Enter Ship Speed

Speed can also be entered in the chart for radar mode. Settings are mutually changed between the radar and chart for radar modes.

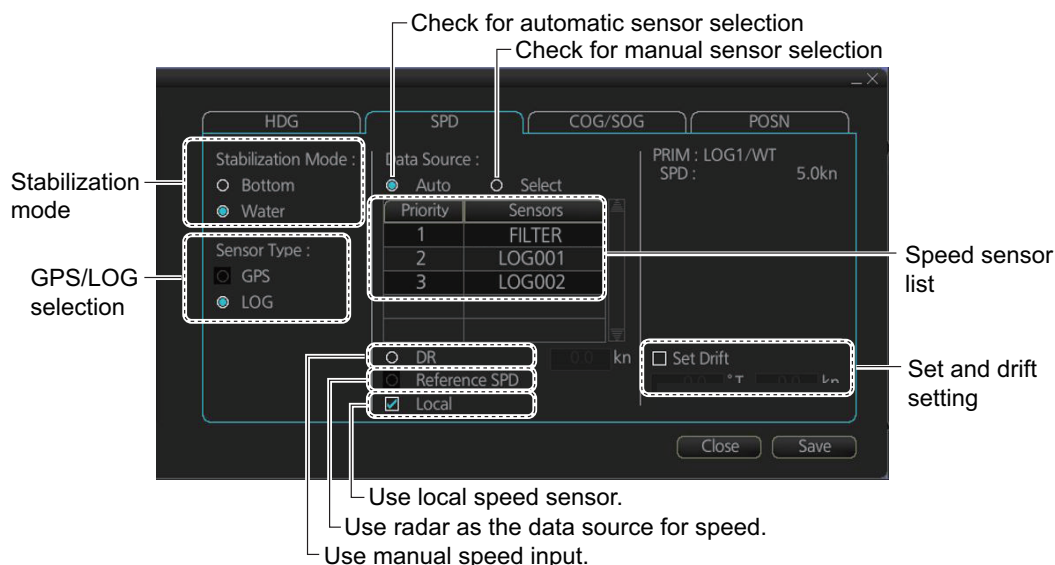
The speed can be entered from a log (STW) or GPS (SOG), or manually on the menu.

Note: If [Local] is not checked, the following sensor settings are synchronized with all FMD-3xxx and FAR-3xxx units on the same network.

1. Right-click anywhere in the Sensor information box to show the context-sensitive menu.
2. Click [Open MENU] to show the [System Sensor Settings] menu.



3. Click the [SPD] tab.



4. Do one of the following:
Automatic speed input
 - 1) Check [Auto] at [Data Source].
 - 2) Check [LOG] or [GPS] at [Sensor Type].
 - 3) Select [Bottom] or [Water] at [Stabilization Mode]. Select [Bottom] if GPS is the source of speed data, or [Water] if a speed log is the source of speed data.

Note: You can set the stabilization mode from the stabilization mode box at the top left of the screen.

Manual speed input

- 1) Confirm that AIS is disabled.
- 2) Select [Water] at [Stabilization Mode].
- 3) Select [DR].
- 4) Use the scrollwheel or keyboard to input speed.
 - Scrollwheel: Spin the wheel to set speed.
 - Keyboard: Enter speed with numeric keys.

Note: For set and drift, see page 16-3.

Local speed sensor input

Check [Local] to set the ship's speed independently from the system speed sensors. However, DR (Dead Reckoning) still uses system sensor speed.

5. Click the [Save] button to save settings.
When [Local] is not checked, after the speed is entered manually you are asked "AIS Function of all units will be turned off. Do you wish to continue?" Click the [OK] button. The confirmation message appears the first time [DR] is selected on the [HDG], [POSN] or [SPD] page.
6. Click the [Close] button to close the menu.

Notes on speed input

- Be sure not to select a LOG option when a speed log is not connected. If the log signal is lost, the GPS sensor is used. In the event of GPS loss, the SPD is shown as "***. * kn".
- The SPD is shown as "***. * kn", and the label "LOG" is erased if no log signal is present for a certain amount of time. The timeout varies according to ship.
- If communication with a sensor is lost or interrupted, the system changes to the next available sensor automatically. For example, if the sensor type is set to [LOG] and the speed log signal is interrupted or lost, the system can switch to a GPS sensor. In this case, the "LOG" indication appears in yellow color.
- A single-axis water log cannot measure speed when the wind is coming from the leeway direction.
- Reference speed is not shared among units.
- To use [Reference SPD], turn off the AIS function and check [Bottom] and [Local] on the [SPD] tab.

6.15 How to Enter Heading

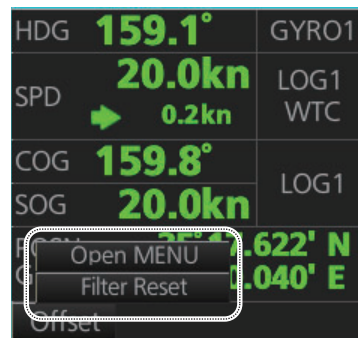
Heading can also be entered in the chart for radar mode. Settings are mutually changed between the radar and chart for radar modes.

Heading can be entered manually or automatically.

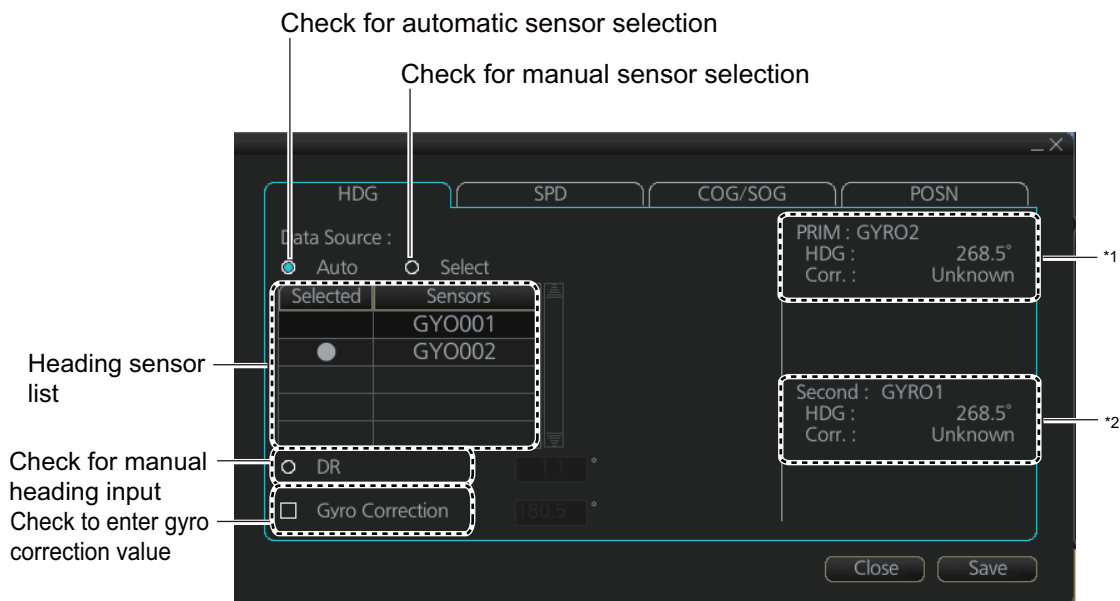
Note 1: The following sensor settings are synchronized with all FMD-3xxx and FAR-3xxx units on the same network.

Note 2: When the vessel is in high latitudes (over 85°), data from the gyrocompass is not used. The internal filter data is used for heading calculation. In this case, the heading source in the sensor information box appears as "FILT". However, high latitudes are not supported in RADAR mode.

1. Right-click anywhere in the Sensor information box to show the context-sensitive menu.
2. Click [Open MENU] to show the [System Sensor Settings] menu.



3. Click the [HDG] tab.



*1 Gyro correction display. (Appears when connected to an autopilot that complies with IEC 62065 Ed. 2.)

*2 [Second] is displayed even if only one gyrocompass is connected.

4. Do one of the following:
Automatic heading input

- 1) Check [Auto] at [Data Source].

Note: To apply correction to the gyrocompass indication, check [Gyro Correction], then spin the scrollwheel to set the correction value.

Manual heading input

- 1) Confirm that AIS is disabled.

- 2) Select [DR].
- 3) Use the scrollwheel or keyboard to input heading.
 - Scrollwheel: Spin the wheel to set heading.
 - Keyboard: Enter heading with numeric keys.
5. Click the [Save] button to save settings.
 After the heading is entered manually you are asked if you are sure to disable the AIS function on all units. Click the [OK] button. The confirmation message appears the first time DR is selected on the [HDG], [POSN] or [SPD] page.
6. Click the [Close] button to close the menu.

6.16 Set up Before Departure

6.16.1 Updates before departure

Update S57 chart material

Update your S57 chart material before embarking on a new voyage. See section 7.19.

Display date and update review dates for S57 charts and manual updates

Note: It is very important that you set the Display and Update Review dates for charts as the current date.

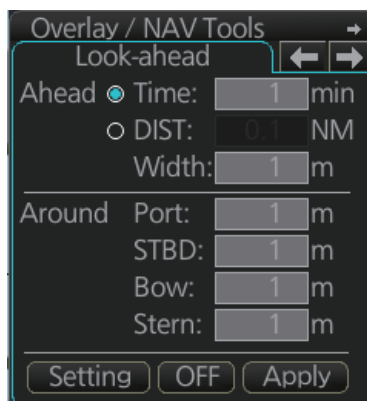
There may be features that require chart viewing dates or seasonal dates in charts. Accordingly, if you have not set Display date and Update Review dates as the current date, there is a possibility that you can get a wrong presentation or some feature may be absent. See section 9.2.

Create or update user chart, Notes

If necessary, create a new user chart and Notes or modify existing ones. See chapter 13.

Chart alert calculation

Set chart alert areas suitable for your coming voyage, on the [Look-ahead] page in the [Overlay/NAV Tools] box. See section 11.2.



6.16.2 Create or update a route

Create a new route or modify an existing one. See chapter 12.

Check your route against chart alerts

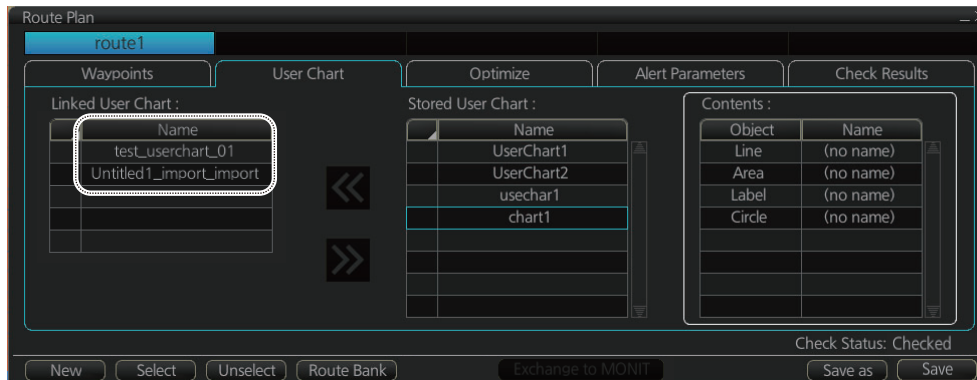
Before you sail your route, you should always check your route against chart alerts. This is important because your S57 charts and manual updates may contain chart viewing dates information. You can check chart alerts from the [Check Results] page on the [Route Plan] dialog box.

The following information is stored with the monitoring route plan:

- Conditions for chart alerts during route monitoring, which includes safety contour and other chart alerts, on the [Alert Parameters] page of the [Route Plan] dialog box.



- Name of the user chart to be used during route monitoring together with this planned route, on the [User Chart] page of the [Route Plan] dialog box.

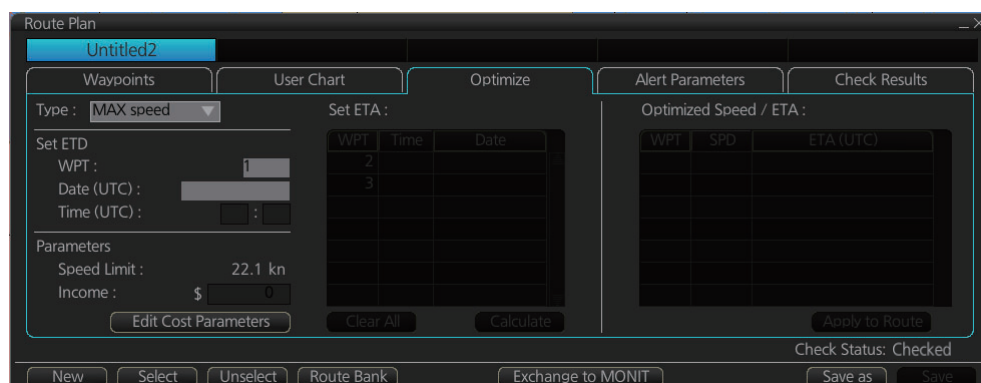


- Name of the Notes to be used during route monitoring together with this planned route, on the [User Chart] dialog box (click the [Planning] button then click the [User Chart] button).



Recalculate timetable and ETA values

Timetable and ETA values can be recalculated from the [Optimize] page in the [Route Plan] dialog box. Minimally set ETD to equal departure time, and set optimization values.



6.16.3 How to check and prepare the route, user chart to monitor

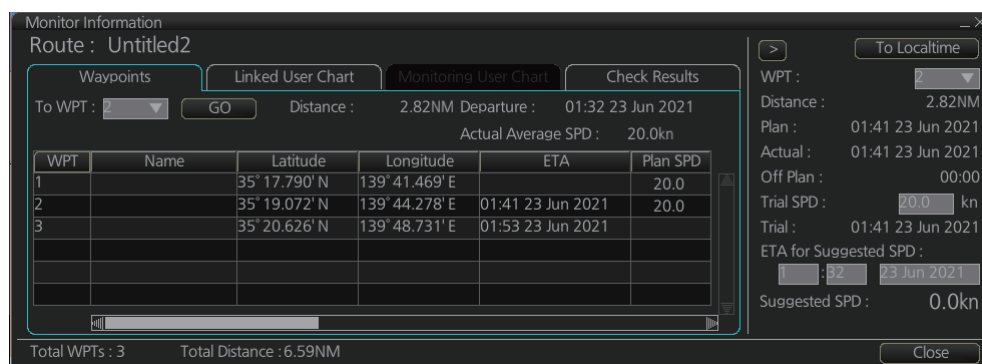
Select the route to monitor, view linked user charts

Select a route for the voyage: In the Voyage navigation mode, click the [Voyage], [Route] and [Select] buttons, or right-click the route indication in the [Route Information] box (right edge of screen) then select [Select Route]. See chapter 14.

The [Monitor Information] dialog box appears, showing the [Waypoints] tab.

Note: A route cannot be opened if its planned settings are different from its navigation settings. The reason is given on the [Select Route] dialog box. In this case, open the route in the Voyage planning mode and click the [Check Route] button, on the [Alert Parameters] page. Adjust the route as necessary.

The To WPT can be selected, however WPT 01 cannot be selected.



To see all the user charts linked to the route, click the [Linked User Chart] tab to show the names of all the user charts linked to the route. Click a user chart to view its contents.